



AVIAN INFLUENZA (BIRD FLU)

Avian Influenza Infection in Humans

Although avian influenza A viruses usually do not infect humans, rare cases of human infection with avian influenza viruses have been reported since 1997. More recently, more than 200 confirmed cases of human infection with avian influenza A (H5N1) viruses have been reported since 2004. The World Health Organization (WHO) maintains situation updates (http://www.who.int/csr/disease/avian_influenza/updates/en/index.html) and cumulative reports of human cases (http://www.who.int/csr/disease/avian_influenza/country/en/index.html) of avian influenza A (H5N1). Most cases of avian influenza infection in humans are thought to have resulted from direct contact with infected poultry or contaminated surfaces. However, there is still a lot to learn about how different subtypes and strains of avian influenza virus might affect humans. For example, it is not known how the distinction between low pathogenic and highly pathogenic strains might impact the health risk to humans. (For more information, see "Low Pathogenic versus Highly Pathogenic Avian Influenza Viruses" on the CDC Influenza Viruses Web page. <http://www.cdc.gov/flu/avian/gen-info/flu-viruses.htm>)

Because of concerns about the potential for more widespread infection in the human population, public health authorities closely monitor outbreaks of human illness associated with avian influenza. To date, human infections with avian influenza A viruses detected since 1997 have not resulted in sustained human-to-human transmission. However, because influenza A viruses have the potential to change and gain the ability to spread easily between people, monitoring for human infection and person-to-person transmission is important. (See Information about Influenza Pandemics (<http://www.cdc.gov/flu/avian/gen-info/pandemics.htm>) for more information.)

Instances of Avian Influenza Infections in Humans

Confirmed instances of avian influenza viruses infecting humans since 1997 include:

- H5N1, Hong Kong, Special Administrative Region, 1997: Highly pathogenic avian influenza A (H5N1) infections occurred in both poultry and humans. This was the first time an avian influenza A virus transmission directly from birds to humans had been found. During this outbreak, 18 people were hospitalized and six of them died. To control the outbreak, authorities killed about 1.5 million chickens to remove the source of the virus. Scientists determined that the virus spread primarily from birds to humans, though rare person-to-person infection was noted.
- H9N2, China and Hong Kong, Special Administrative Region, 1999: Low pathogenic avian influenza A (H9N2) virus infection was confirmed in two children and resulted in uncomplicated influenza-like illness. Both patients recovered, and no additional cases were confirmed. The source is unknown, but the evidence suggested that poultry was the source of infection and the main mode of transmission was from bird to human. However, the possibility of person-to-person transmission could not be ruled out. Several additional human H9N2 infections were reported from China in 1998-99.
- H7N2, Virginia, 2002: Following an outbreak of H7N2 among poultry in the Shenandoah Valley poultry production area, one person was found to have serologic evidence of infection with H7N2.

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- H5N1, China and Hong Kong, Special Administrative Region, 2003: Two cases of highly pathogenic avian influenza A (H5N1) infection occurred among members of a Hong Kong family that had traveled to China. One person recovered, the other died. How or where these two family members were infected was not determined. Another family member died of a respiratory illness in China, but no testing was done.
- H7N7, Netherlands, 2003: The Netherlands reported outbreaks of influenza A (H7N7) in poultry on several farms. Later, infections were reported among pigs and humans. In total, 89 people were confirmed to have H7N7 influenza virus infection associated with this poultry outbreak. These cases occurred mostly among poultry workers. H7N7-associated illness included 78 cases of conjunctivitis (eye infections) only; 5 cases of conjunctivitis and influenza-like illnesses with cough, fever, and muscle aches; 2 cases of influenza-like illness only; and 4 cases that were classified as "other." There was one death among the 89 total cases. It occurred in a veterinarian who visited one of the affected farms and developed acute respiratory distress syndrome and complications related to H7N7 infection. The majority of these cases occurred as a result of direct contact with infected poultry; however, Dutch authorities reported three possible instances of transmission from poultry workers to family members. Since then, no other instances of H7N7 infection among humans have been reported.
- H9N2, Hong Kong, Special Administrative Region, 2003: Low pathogenic avian influenza A (H9N2) infection was confirmed in a child in Hong Kong. The child was hospitalized and recovered.
- H7N2, New York, 2003: In November 2003, a patient with serious underlying medical conditions was admitted to a hospital in New York with respiratory symptoms. One of the initial laboratory tests identified an influenza A virus that was thought to be H1N1. The patient recovered and went home after a few weeks. Subsequent confirmatory tests conducted in March 2004 showed that the patient had been infected with avian influenza A (H7N2) virus.
- H7N3, Canada, 2004: In February 2004, human infections of highly pathogenic avian influenza A (H7N3) among poultry workers were associated with an H7N3 outbreak among poultry. The H7N3-associated, mild illnesses consisted of eye infections.
- H5N1, Thailand and Vietnam, 2004: In late 2003, outbreaks of highly pathogenic influenza A (H5N1) in poultry in Asia were first reported by the World Health Organization. Human infections with H5N1 were reported beginning in 2004, mostly resulting from contact with infected poultry. However, in Thailand one instance of probable human-to-human spread is thought to have occurred.
- H5N1, Cambodia, China, Indonesia, Thailand and Vietnam, 2005: Human infections with H5N1 occurred in association with the ongoing H5N1 epizootic in the region. At least two persons in Vietnam were thought to have been infected through consumption of uncooked duck blood.
- H5N1, Azerbaijan, Cambodia, China, Djibouti, Egypt, Indonesia, Iraq, Thailand, Turkey, 2006: Human infections with H5N1 occurred in association with the ongoing and expanding epizootic. While most of these cases occurred as a result of contact with infected poultry, in Azerbaijan (<http://www.who.int/wer/2006/wer8118.pdf>), the most plausible cause of exposure to H5N1 in several instances of human infection is thought to be contact with infected dead wild birds (swans).

Symptoms of Avian Influenza in Humans

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The reported symptoms of avian influenza in humans have ranged from typical influenza-like symptoms (e.g., fever, cough, sore throat, and muscle aches) to eye infections (conjunctivitis), pneumonia, acute respiratory distress, viral pneumonia, and other severe and life-threatening complications.

Antiviral Agents for Influenza

Four different influenza antiviral drugs (amantadine, rimantadine, oseltamivir, and zanamivir) are approved by the U.S. Food and Drug Administration (FDA) for the treatment and prevention of influenza. All four have activity against influenza A viruses. However, sometimes influenza strains can become resistant to these drugs, and therefore the drugs may not always be effective. For example, analyses of some of the 2004 H5N1 viruses isolated from poultry and humans in Asia have shown that the viruses are resistant to two of the medications (amantadine and rimantadine). Also, please note the January 14, 2006 CDC Health Alert Notice (HAN) (<http://www.cdc.gov/flu/han011406.htm>), in which CDC recommends that neither amantadine nor rimantadine be used for the treatment or prevention (prophylaxis) of influenza A in the United States for the remainder of the 2005-06 influenza season. Monitoring of avian influenza A viruses for resistance to influenza antiviral medications is ongoing.

For more information, visit <http://www.cdc.gov/flu/avian>,
or call CDC at 800-CDC-INFO (English and Spanish) or 888-232-6348 (TTY).

August 9, 2006

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